

# Hypersonic Sound System

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**Abstract:** Hypersonic sound technology from American Technology Corporation employs ultrasonic waves to create audible sound in the air. It works by using harmless ultrasonic tones that we can't hear. These tones use the property of air to create new tones that are within the range of human hearing. The result is audible sound. The acoustical sound wave is created directly in the air molecules by down-converting ultrasonic energy to the frequency spectrum we can hear. Hyper Sonic Sound is produced without the excess baggage of conventional speakers--there are no voice coils, cones, crossover networks, or enclosures. The result is sound with a potential purity and fidelity attained. Sound quality is no longer tied to speaker size. The Hyper Sonic Sound system holds the promise of replacing conventional speakers wherever they are used: in the home, in movie theaters, in automobile.

**Keywords:** Hyper Sonic Sound, American Technology Corporation.

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## 1. INTRODUCTION

Hyper Sonic Sound (HSS) is a pioneering sound-generation technology that broadcasts your message directly to your intended audience. In contrast to conventional loudspeakers, HSS technology uses a directional ultrasonic column to produce sound exactly where you want it. Sound does not spread to the sides or rear of an HSS unit, eliminating the problem of uncomfortable and unwanted noise pollution produced by conventional speakers. Sound is directed only where it is intended to go. Visualize two people standing four feet apart at an art exhibit. One patron listens to a biography of a sculpture artist, while the other contemplates a painting in complete silence! HSS is like handing someone a set of headphones. By focusing sound in a tight column, HSS allows you to restrict sound to a specific area without imposing on nearby speakers focused on the area in front of only directory users to hear the corresponding audio.

## 2. WORKING

Hyper Sonic Sound technology creates audible sound from the interaction of two high-frequency signals that are themselves inaudible. A reference signal is held constant at 200 kHz and a variable signal which ranges from 200.020 kHz to 220 kHz are the signals used. The reference signal combines with variable signal to produce audible signal in the air whose frequency is equal to the difference between the variable and reference frequencies. As an example to produce a sound of 263 Hz, the variable signal is made to 200.263 kHz. These ultrasonic frequencies are inaudible by themselves. However, the interaction of the air and ultrasonic frequencies creates audible sounds that can be heard along a column. This audible acoustical sound wave is caused when the air down-converts the ultrasonic frequencies to the lower frequency spectrum that humans can hear. The basic operating principle of HSS uses a property of air known as "non-linearity". A normal sound wave (like someone talking) is a small pressure wave that travels through the air. As the pressure goes up and down, the "nonlinear" nature of the air itself causes the sound waves to be changed slightly. If you change the sound waves, new sounds (frequencies) are formed within the wave. Therefore, if we know how the air affects the sound waves, we can predict exactly what new frequencies (sounds) will be added into the sufficient volume to cause the air to create these new frequencies. Since we cannot hear the ultrasonic sound, we only hear the new sounds that are formed by the non-linear action of the air. Since the audible sound is produced inside the column of ultrasonic frequencies (which is highly directional), an important by-product of this is that the audible sound can be tightly focused in any direction within the listening environment. This provides outstanding edibility in placing the sound exactly where you want it and substantially eliminating sound in all other areas. The directionality of the HSS system is unsurpassed, with

the added benefit of long projection distances and retention of intelligibility. Getting sound right where it is wanted eliminates having to use high sound pressure levels to get sound to carry to distant points.

### **3. ADVANTAGES**

- 1) Highly focused directional audio.
- 2) Very thin and light weight transducer used as ultrasonic emitter.
- 3) The sound only can hear within a particular angle.
- 4) Provide HD real audio for virtual reality (virtual real audio processing is possible).
- 5) Support multi channel audio.

### **4. APPLICATIONS**

As the waves disperse, properties of the air cause them to break into three additional frequencies, one of which you can hear. This sonic frequency gets trapped within the other three, so it stays within the ultrasonic cone to create directional audio. Step into the beam and you hear the sound as if it were being generated inside your head. Reflect it off a surface and it sounds like it originated there. At 30,000 cycles, the sound can travel 150 yards without any distortion or loss of volume. Some application's of HYPERSONIC SOUND SYSTEM as follows.

1 Sound Bullets

2. Moving movie voice.
3. Pointed Messages.
4. Discreet Speakerphone.
- 5 Automobiles - HSS announcement device in the dash to beam alert signals directly to the driver
6. Audio/Video Conferencing - project the audio from a conference in four different languages, from a single central device, without the need for headphones.
7. Paging Systems - direct the announcement to the specific area of interest.
8. Safety Officials - portable bull horn type device for communicating with a specific person in a crowd of people .
9. Military Applications -ship to ship communications, ship-board announcements.

### **5. CONCLUSION**

As a conclusive remark, this paper discussed about the coming of the Hypersonic Speaker Systems which are yet not implemented, but is a real promising innovation which may be applied in our everyday life and will revolutionize the sound technology. This paper discussed about the invention, the inventor, the motive behind the invention, etc. Also discussed about how hypersonic sound is created and how the hypersonic system works, which method is used, etc. What the advantages of hypersonic speakers are, over conventional systems.

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